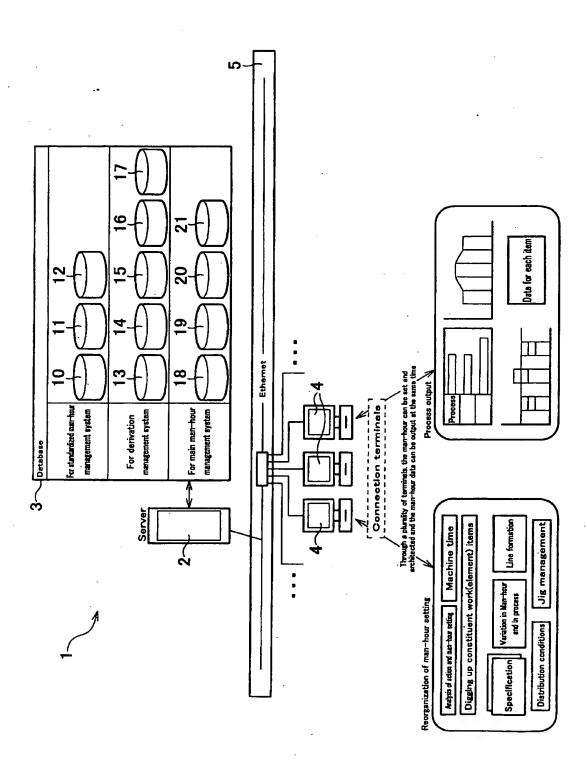
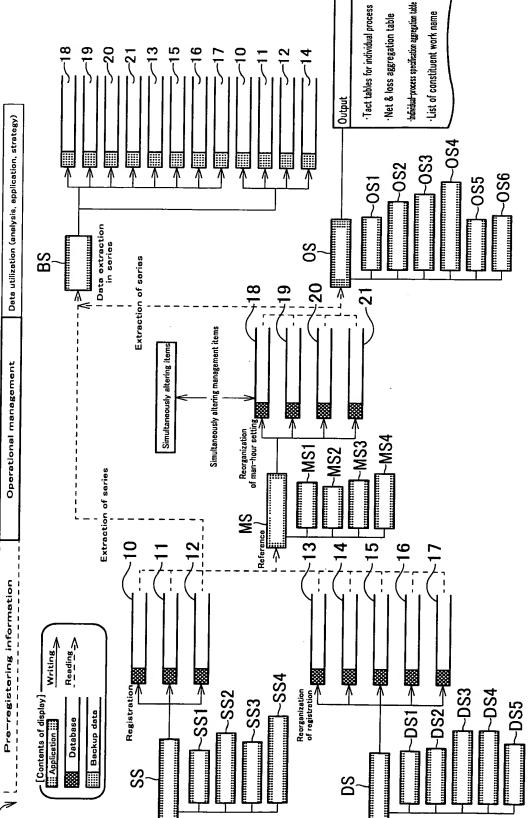
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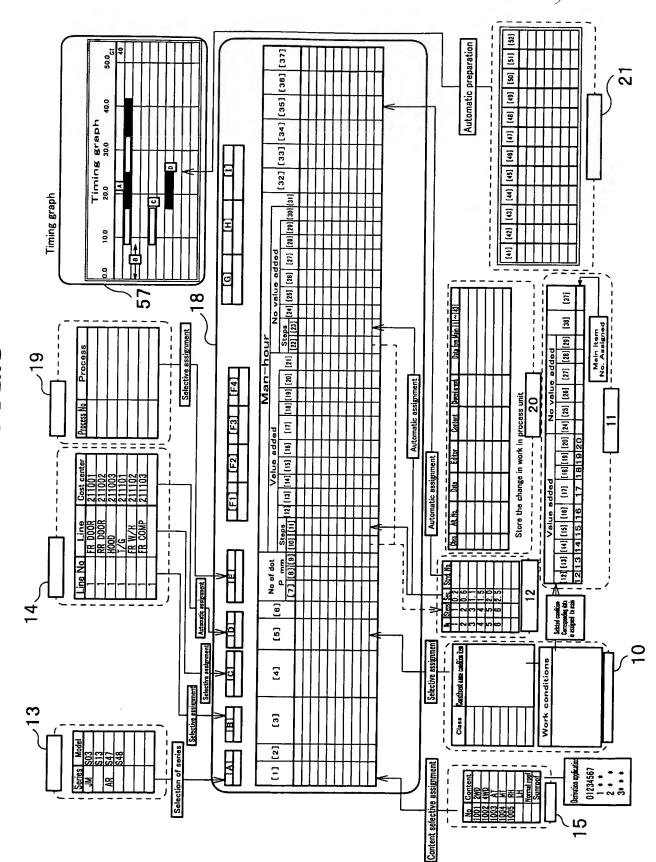






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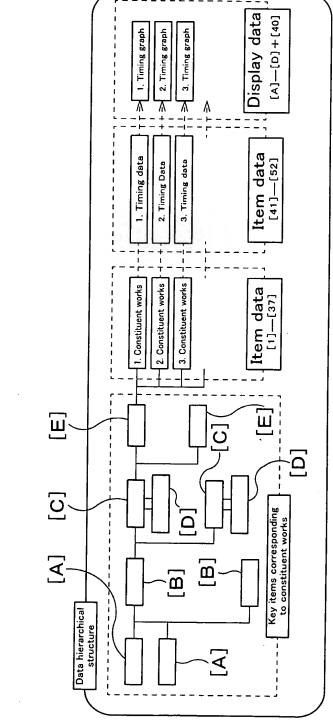
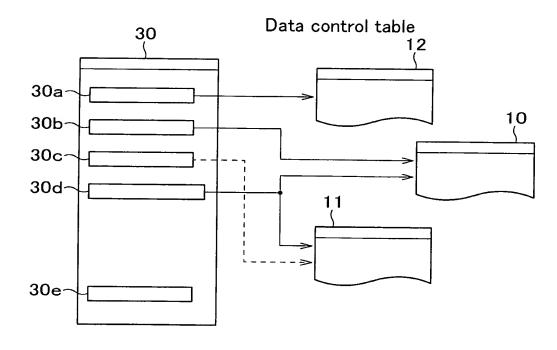


FIG.4

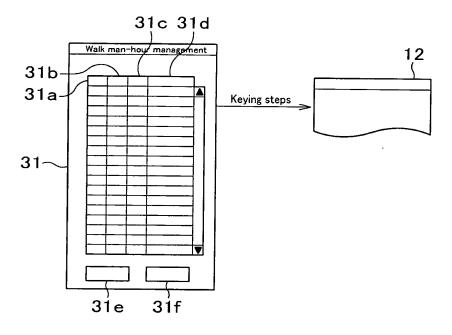
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FIG.5

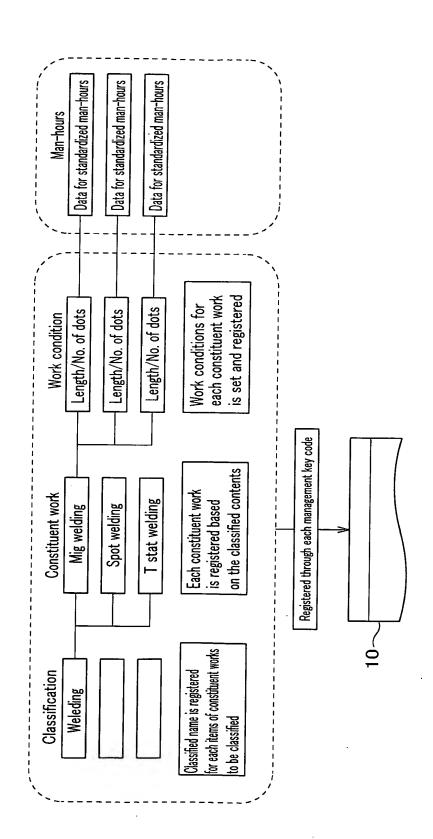


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FIG.6



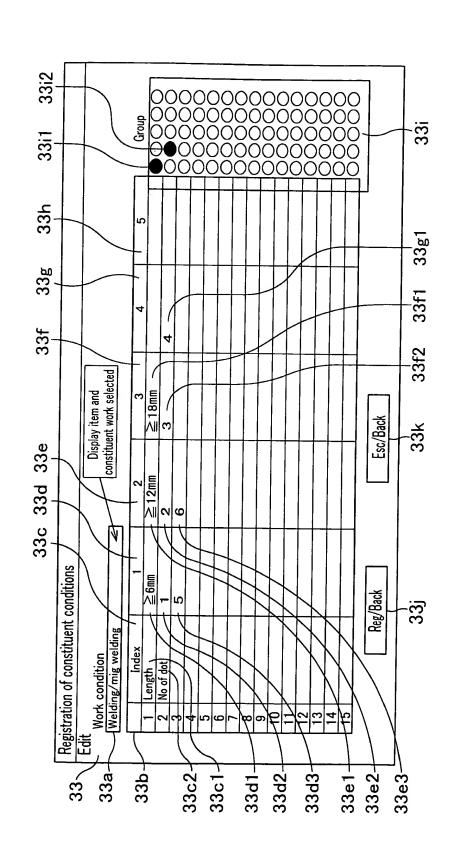
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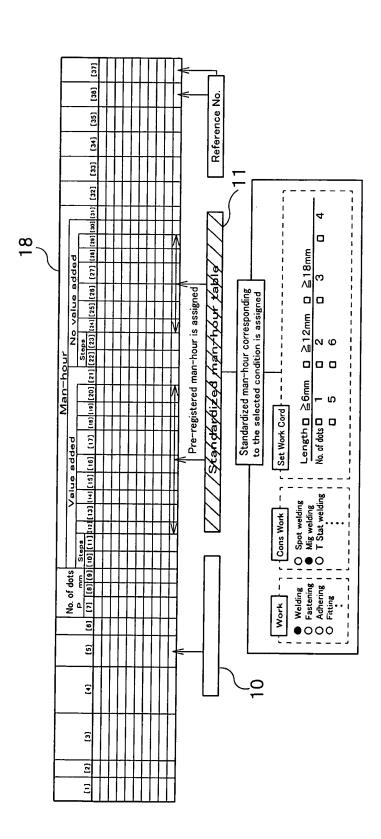
32b3 32d 32b2 32c32b1 T-Stat welding Constituent work Spot welding -32b Mig welding 0\_ 0 0 0 0 0 32 Basic setting of constituent work 0 0 0 0 32a Class Welding 0  $\overline{\circ}$ 0 0 32a2+ 32b5-32b4-32b6-

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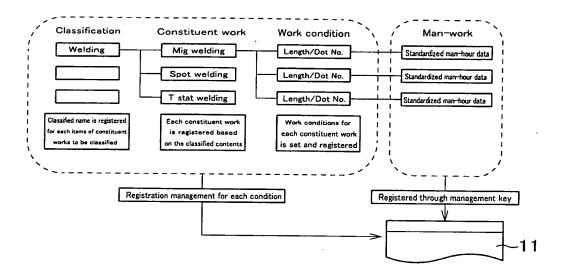
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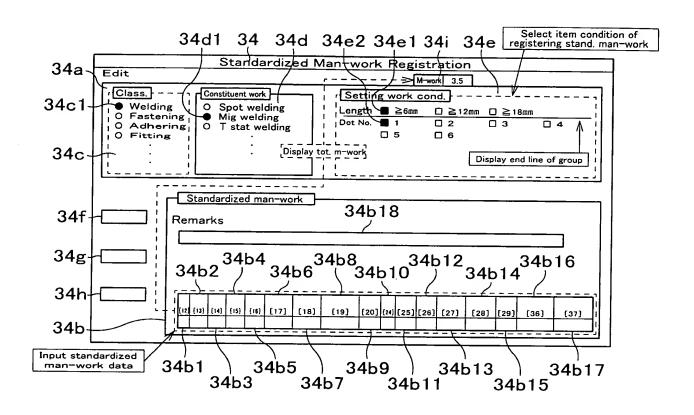
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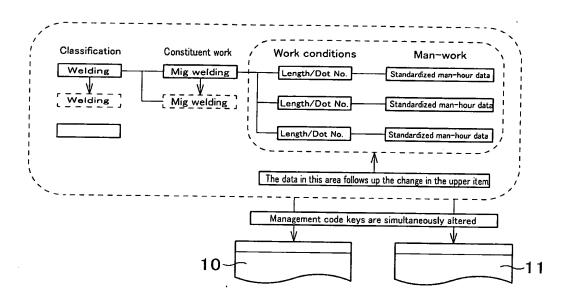
Merchant & Gould P.C. Inventor: YAMAMOTO et al. Docket No.: 13425.10US01 Title: MAN-HOUR MANAGEMENT SYSTEM Attorney Name: Curtis B. Hamre Phone No.: 612.336.4722 Sheet 12 of 54

### FIG.9B



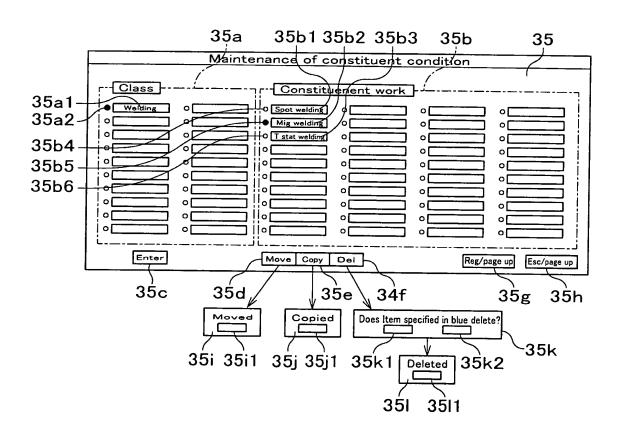
Merchant & Gould P.C. Inventor: YAMAMOTO et al. Docket No.: 13425.10US01 Title: MAN-HOUR MANAGEMENT SYSTEM Attorney Name: Curtis B. Hamre Phone No.: 612.336.4722 Sheet 13 of 54

## FIG.10A



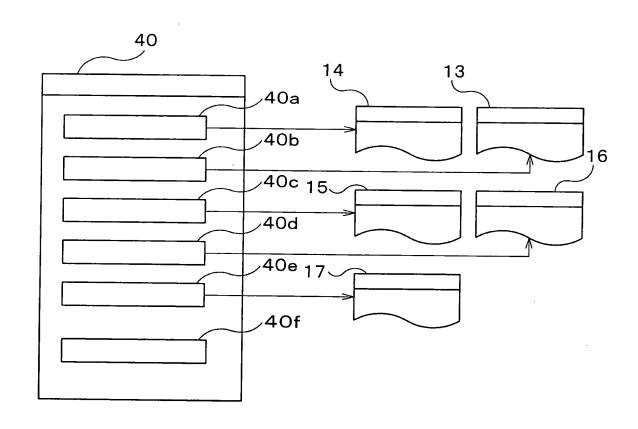
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## FIG.10B

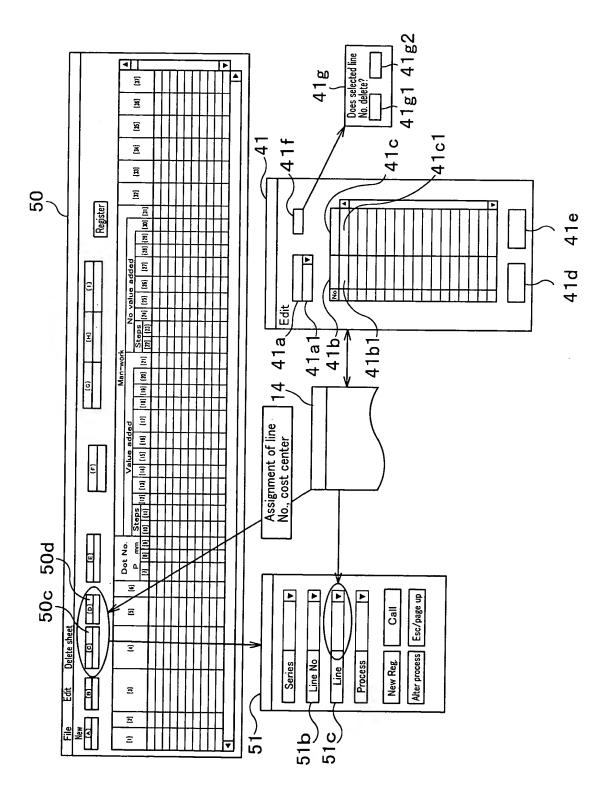


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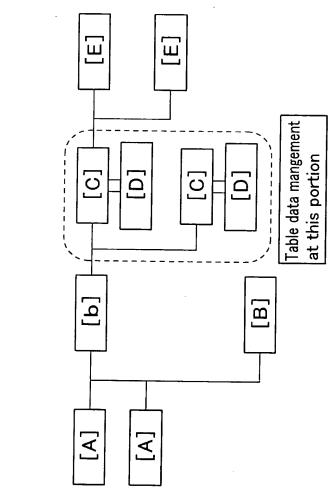
FIG.11



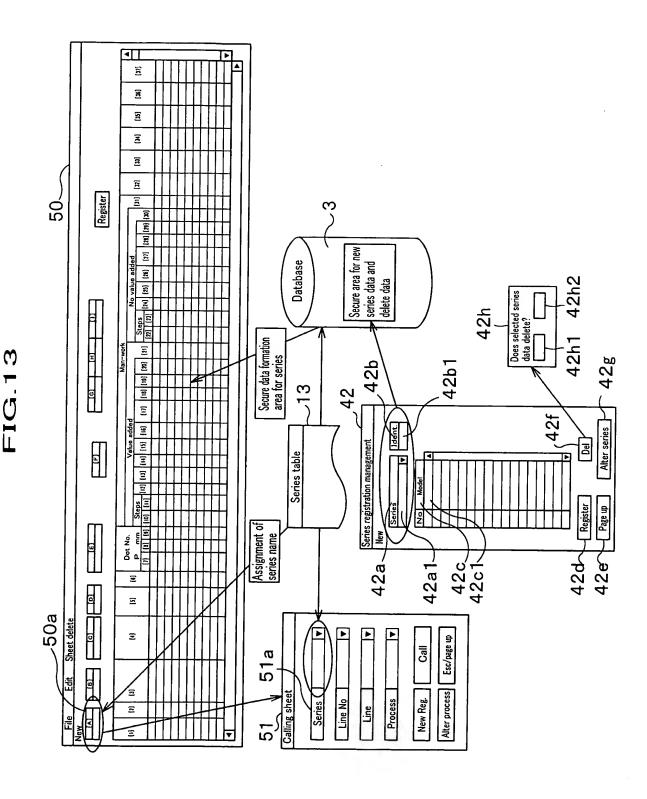
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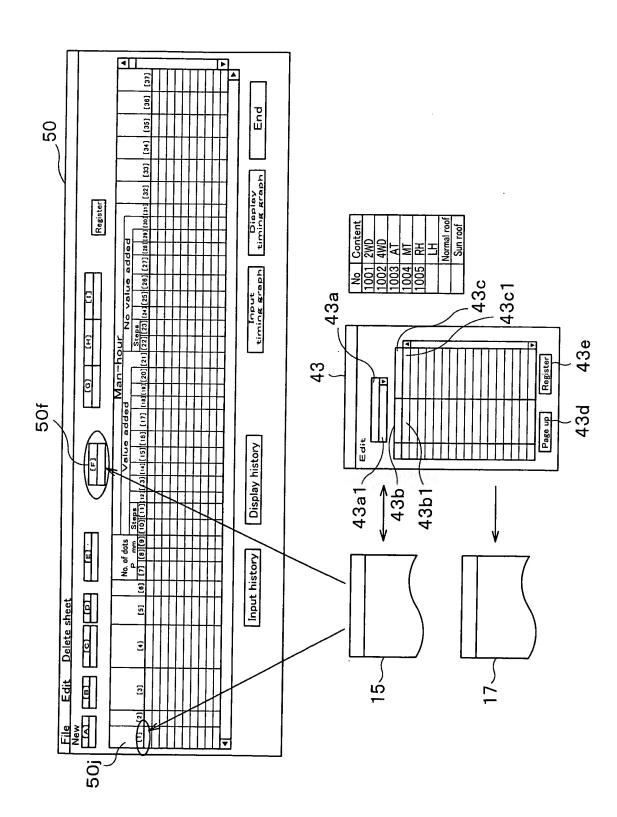
Merchant & Gould P.C. Inventor: YAMAMOTO et al. Docket No.: 13425.10US01 Title: MAN-HOUR MANAGEMENT SYSTEM Attorney Name: Curtis B. Harure Phone No.: 612.336.4722 Sheet 18 of 54



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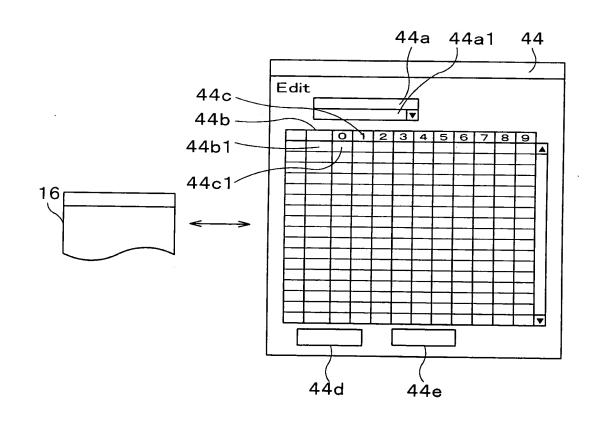
FIG. 14

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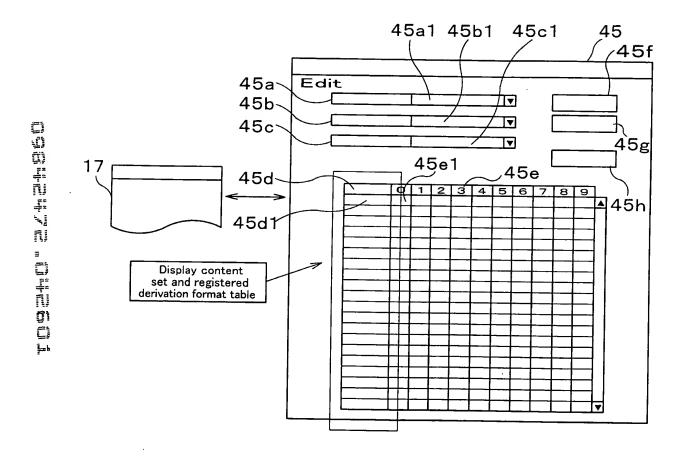
Merchant & Gould P.C. Inventor: YAMAMOTO et al. Docket No.: 13425.10US01 Tide: MAN-HOUR MANAGEMENT SYSTEM Attorney Name: Curris B. Hamre Phone No.: 612.336.4722 Sheet 20 of 54

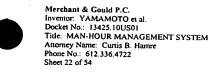
FIG.15

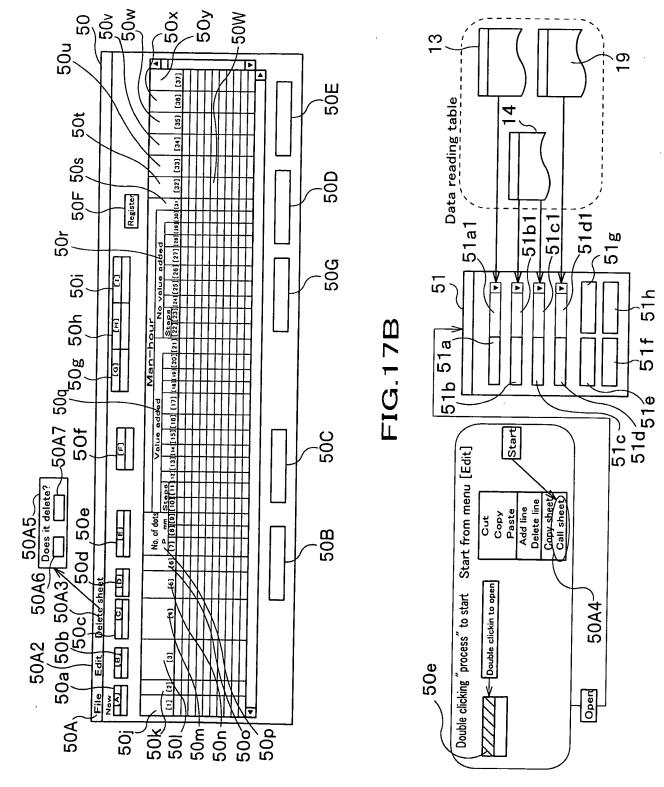


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FIG.16

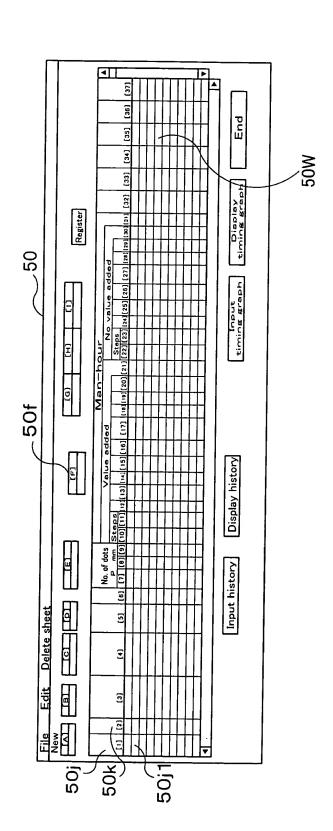






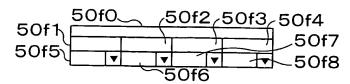
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FIG.18A

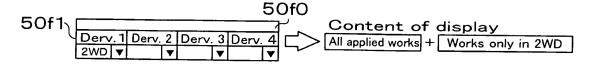


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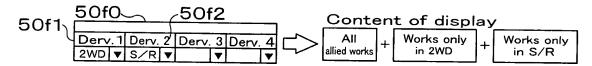
#### **FIG.18B**



## FIG.18C



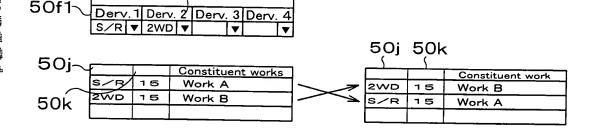
#### FIG.18D



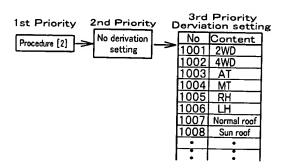
#### **FIG.18E**

50f0

50f2



## **FIG.18F**



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50v 50v 50y 50v 50v End Find Display timing graph 50 50t Register 50r Input timing graph 75098 (\)
75098 (\)
7092 5096
7091 (5095 Ξ Man-hour [0] (50q3)/ 1-50q1 (E) Display History 50g 50m1 /50p1/50p3 5011 50o1 50p2 200 50p No. of dots P mm [7] [[8]][9] Input history [6] [3] 50m Ξ Normal roof No Content 1001 2WD 1002 4WD 1003 AT 1004 MT 1005 RH Sun roof 50K 50I (3) 50k1 [2]

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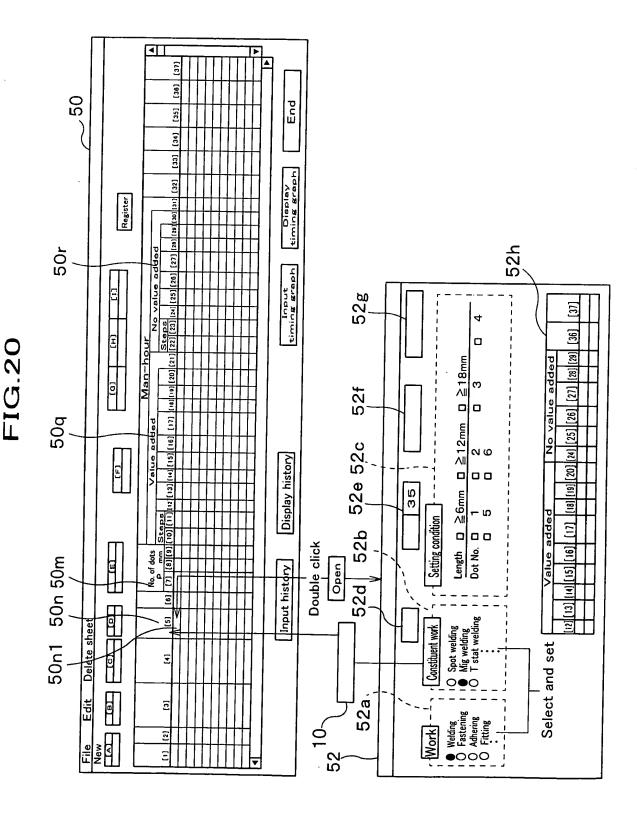
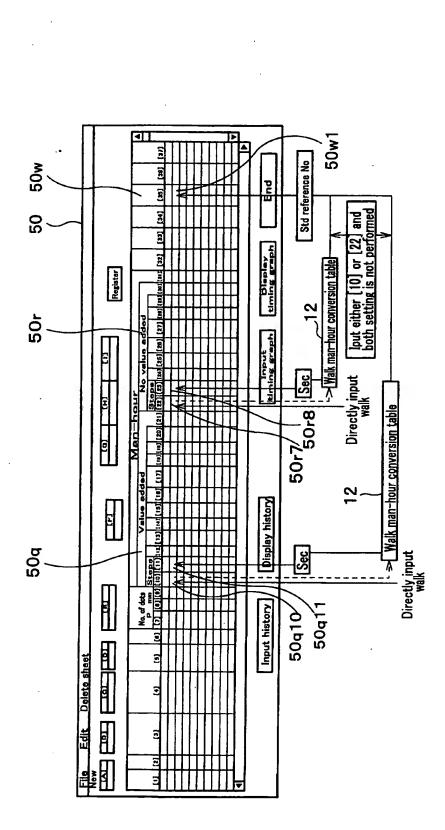


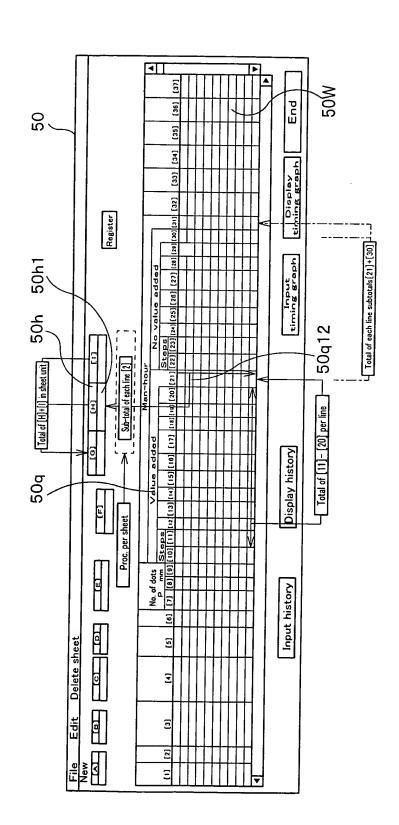
FIG.21

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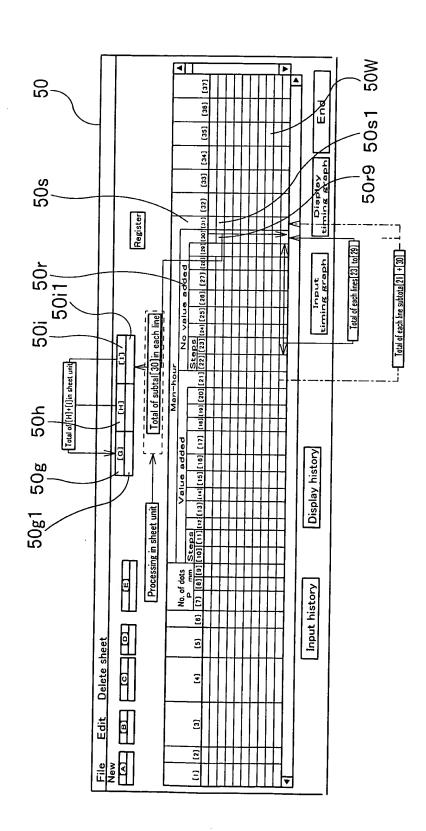
#### [37] [36] [36] End 50 [34] [33] Display timing graph [35] Register [18] [18] [20] [21] [23] [24] [24] [25] [28] [21] [22] [28] **50**r Input timing graph Write the total of wait $[1] \sim [5]$ on wait [29] of \*write at storage of timing data in man works main man-work management as a line unit <u>5</u> ~21 Subtotal [30] + [31] is re-calculated and is required to be written on DB Steps | 12 [13] [14] [15] [16] [17] Processing main data Total 2 Ope. 5 Display history Ξ Wait 5 ,21h Ope. 4 Dot No. P mm [7] [8] [9] Weit 4 21f Ξ Input history Ope. 3 [8] Ope. 2 Wait 3 2,2 21d 9 [3] File Edit Delete sheet [c] 3 Ope. 1 | Wait 2 21b (8) [3 Wait 1 2,5 [2] Ξ ST



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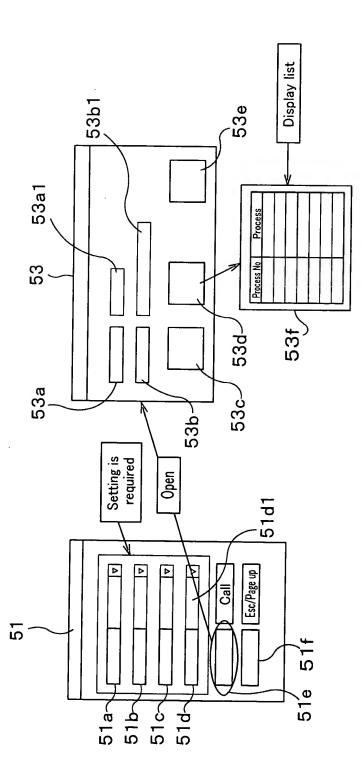


FIG. U



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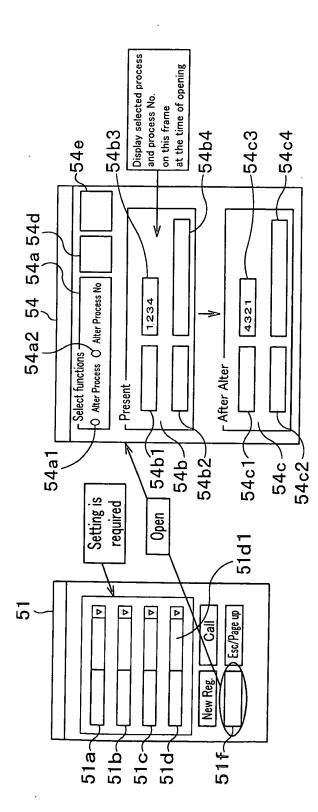
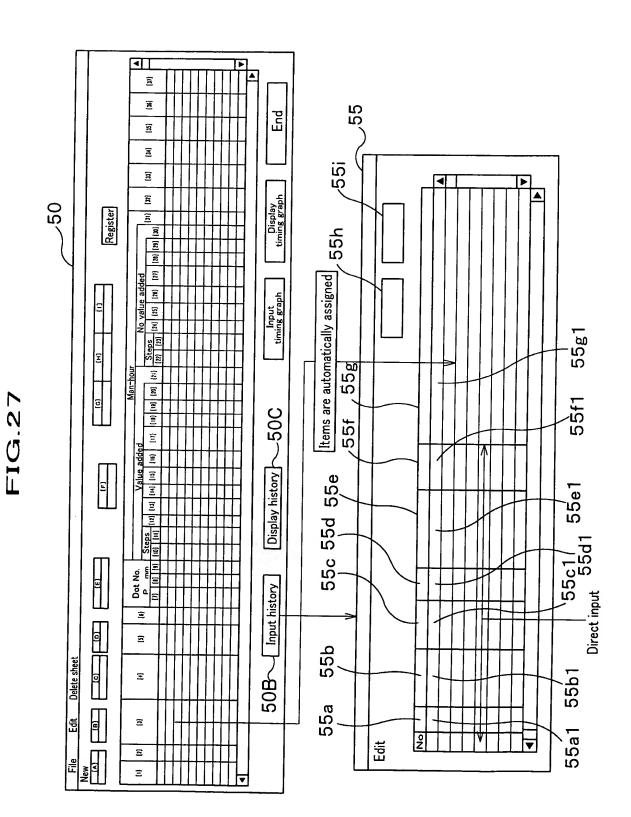


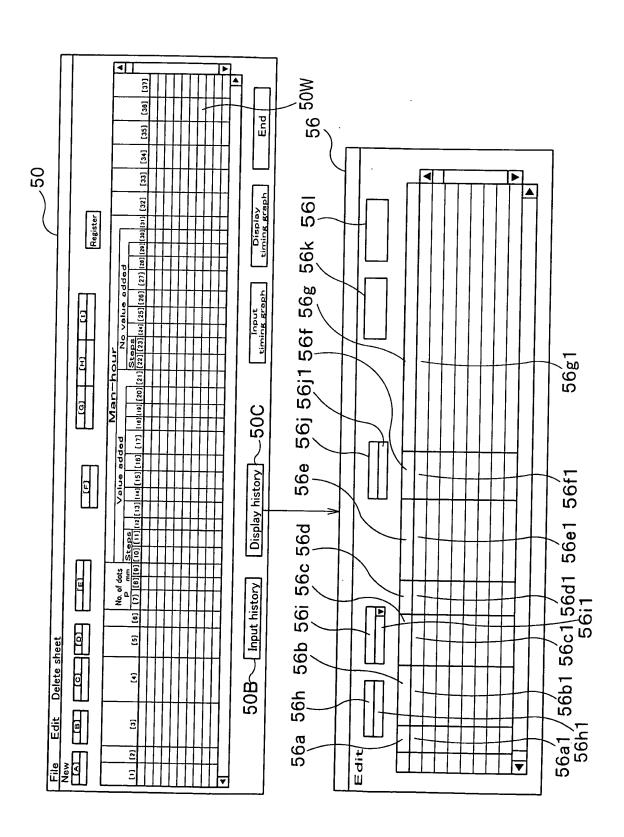
FIG. 20





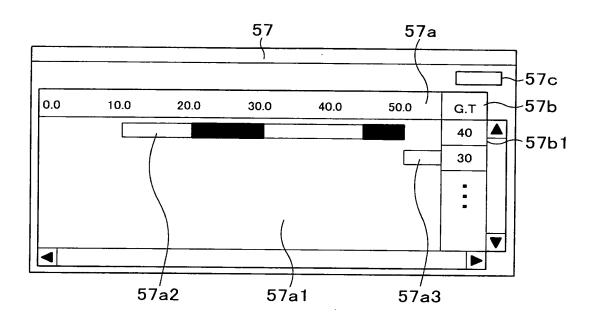
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FIG.28



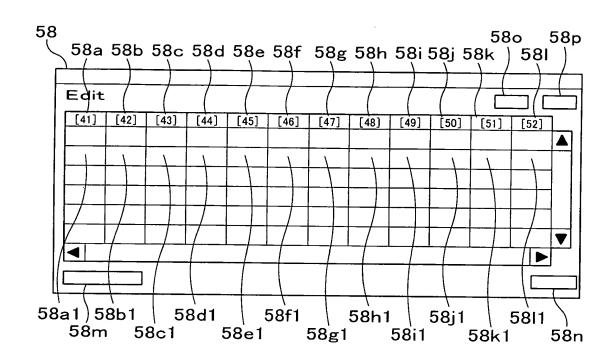
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## FIG.29A

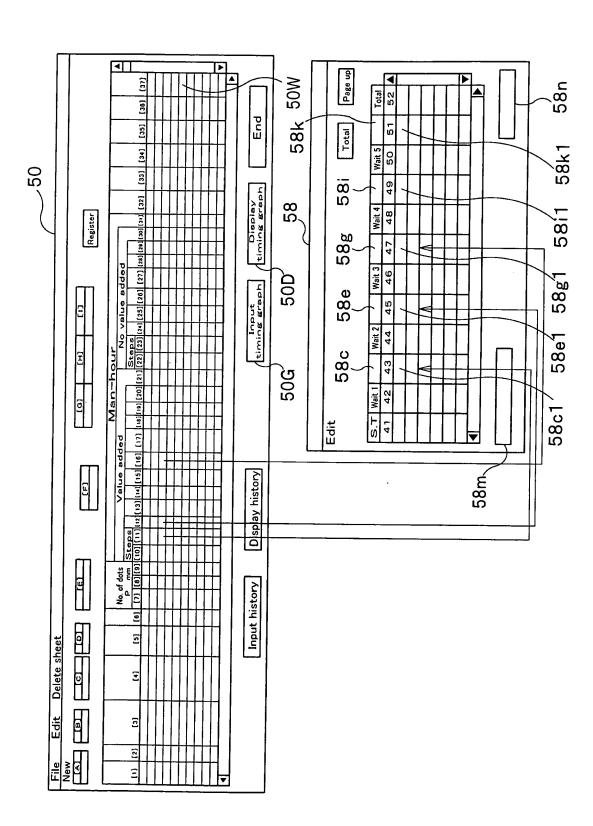


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# FIG.29B



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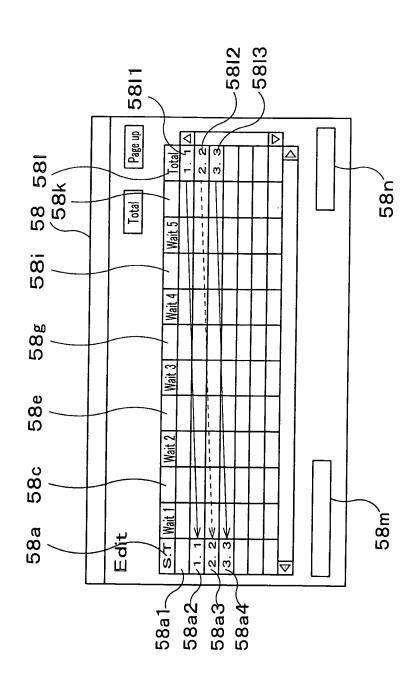




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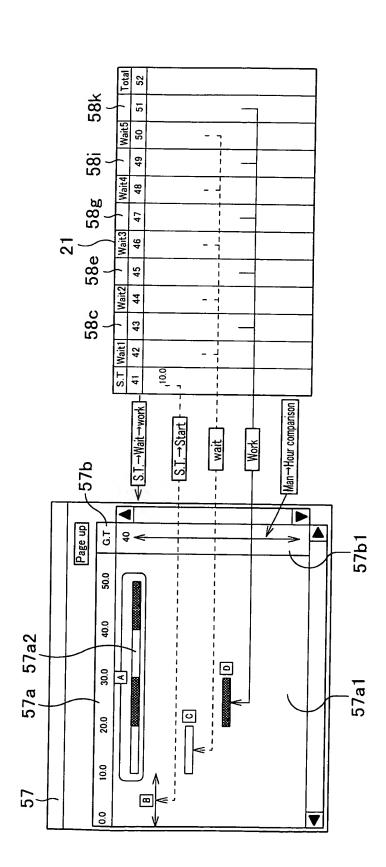


FIG. 31



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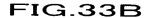
FIG.32

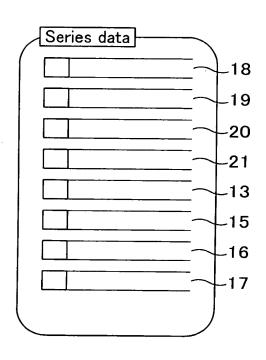


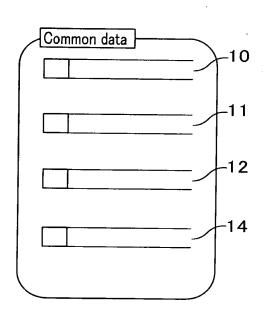
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 $-\mathsf{FD2}$ FD4 Text data Back up Extract FIG.33A Common data Database SeriesC SeriesA SeriesB Extract Back up Text data FDT FD37

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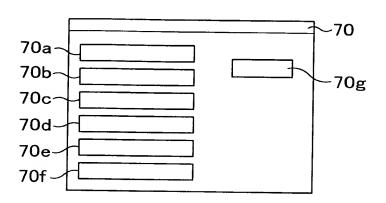


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-60a5 09 60cFIG.34 60a3 60a4 Edit 60a1+ 60b1+ 60a2 60b2-60a~ ~909

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FIG.35

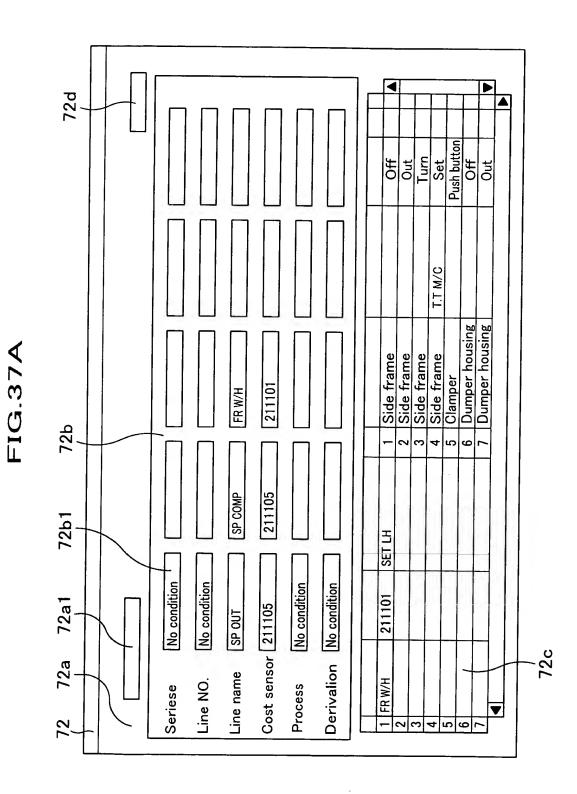


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71i 71h 71c3 7.ih1 71c2 71g ▶ 71g1 1211105 211105 211101 71c1 71f ▶ ▶ ▶ 71f1 SP COMP FR W/H SP OUT 71c 71e 7161 ▲ 71<sup>'</sup>e1 71a1 71d Output Output to 71<sup>'</sup>d1 71b-71a-

FIG.36

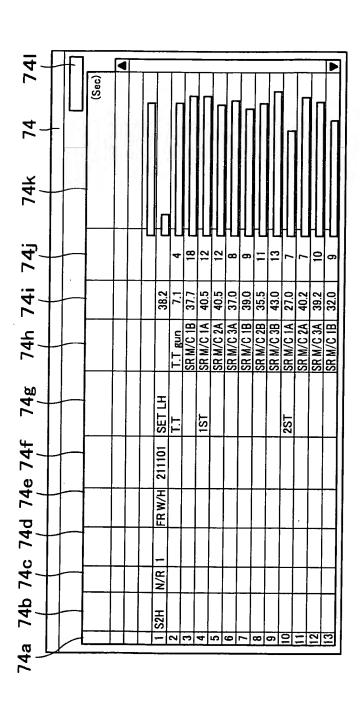
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73a One cycle time 73b FIG.37B •••Lost process •••Net process Transfer machine backward Transfer machine down Transfer machine up Welding robot 1 Welding robot 2 Preparation Parts set Switch ON

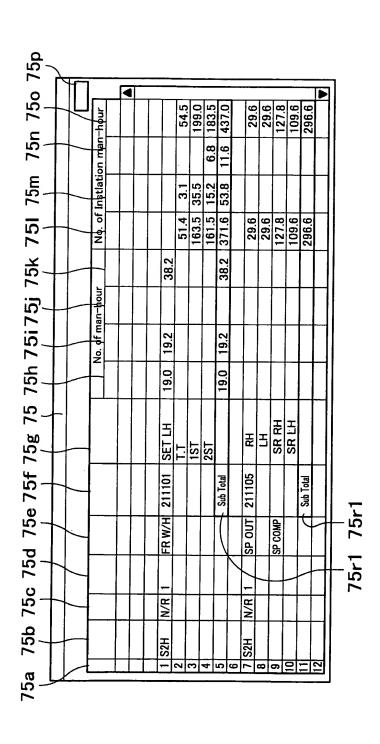
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FIG.38



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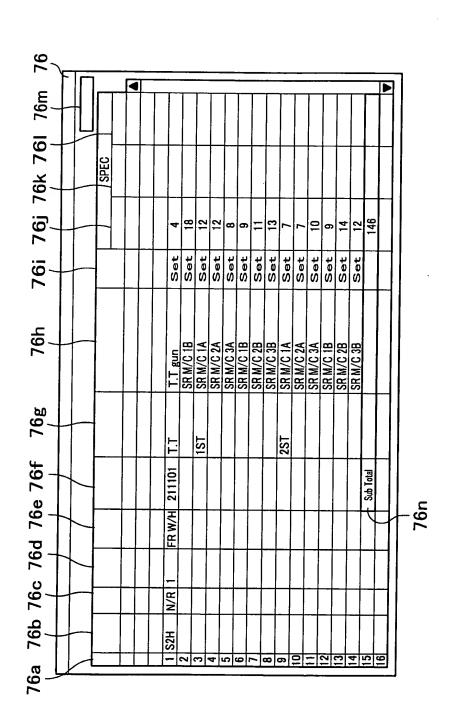
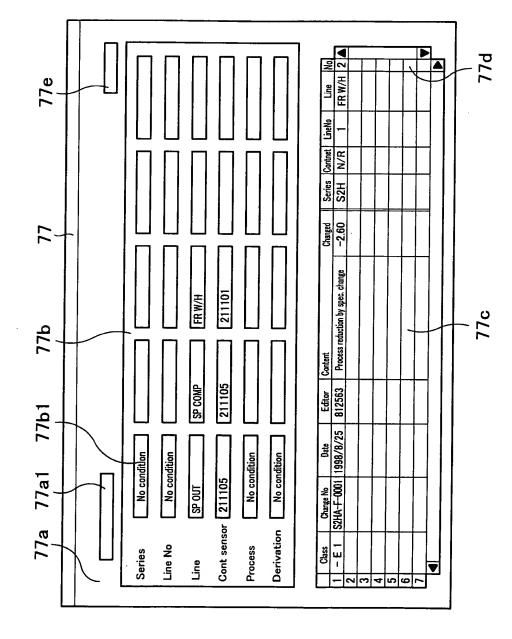


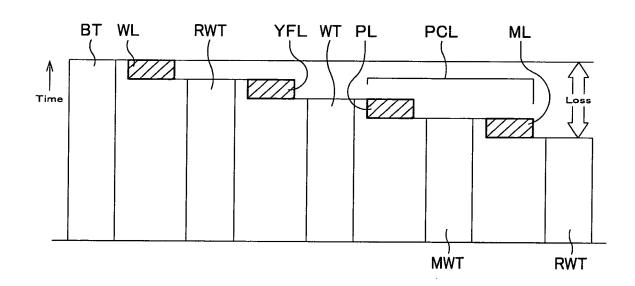
FIG.41

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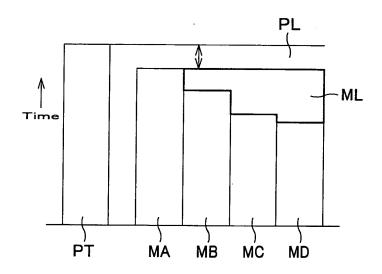
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## FIG.42A



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FIG.42B



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Tearing off Body turn Returning Reforming Tethtening Putting Cutting Moving Evidence of movement for determing scale of work (Improved MOST) Movement classification Open/chase Puctuation Pasting Pouring Tearing Pushing Set ž Supplemental section Main action Ouesqu-ection AM N N O ₩ Work classification - Supplemental work Main work ₹ <del>/</del> Me გე--Const. work Understand amount(scale) of work through MOST Reference man-hour Cost center -Model Parts



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**FIG.44** 

